

WHAT IS CLAIMED IS:

1. A method for obtaining a bacterium having enhanced viability or enhanced transformation efficiency during storage at low temperatures, said method comprising:
 - a. modifying a bacterium such that the fatty acid content of said bacterium is altered; and
 - b. isolating a modified bacterium having enhanced viability or enhanced transformation efficiency during storage at low temperatures.
2. The method of claim 1, wherein said modification step comprises genetically altering said bacterium.
3. The method of claim 1, wherein said modification step comprises modifying one or more genes involved in changing unsaturated fatty acid content of said bacterium.
4. The method of claim 1, wherein said modification step comprises increasing the amount of one or more unsaturated fatty acids in said bacterium.
5. The method of claim 3, wherein said modification step comprises enhancing expression of one or more of said unsaturated fatty acid genes.
6. The method of claim 5, wherein said enhanced expression comprises increasing copy number of said genes.
7. The method of claim 5, wherein said enhanced expression comprises increasing transcription or translation of said genes.

8. The method of claim 1, wherein said bacterium is a gram negative bacterium.
9. The method of claim 8, wherein said bacterium is *Escherchia*.
10. The method of claim 9, wherein said bacterium is *E. coli*.
11. The method of claim 1, wherein said fatty acid is an unsaturated fatty acid selected from the group consisting of oleic acid, linoleic acid, palmitoleic acid, and cis-vaccenic acid.
12. The method of claim 11, wherein said unsaturated fatty acid is selected from the group consisting of cis-vaccenic acid and palmitoleic acid.
13. The method of claim 1, wherein said modified bacterium has an altered unsaturated fatty acid content in the bacterial membrane.
14. The method of claim 1, wherein said low temperatures range from about -20°C to about 4°C.
15. A method for enhancing viability or enhancing transformation efficiency of a bacterium during storage at low temperatures, said method comprising altering the fatty acid content of said bacterium.
16. The method of claim 15, wherein said modification step comprises genetically altering said bacterium.
17. The method of claim 15, wherein said modification step comprises modifying one or more genes involved in changing unsaturated fatty acid content of said bacterium.

18. The method of claim 15, wherein said modification step comprises increasing the amount of one or more unsaturated fatty acids in said bacterium.
19. The method of claim 17, wherein said modification step comprises enhancing expression of one or more of said unsaturated fatty acid genes.
20. The method of claim 19, wherein said enhanced expression comprises increasing copy number of one or more of said genes.
21. The method of claim 19, wherein said enhanced expression comprises increasing transcription or translation of one or more of said genes.
22. The method of claim 15, wherein said bacterium is a gram negative bacterium.
23. The method of claim 22, wherein said bacterium is *Escherchia*.
24. The method of claim 23, wherein said bacterium is *E. coli*.
25. The method of claim 15, wherein said fatty acid is an unsaturated fatty acid selected from the group consisting of oleic acid, linoleic acid, palmitoleic acid, and cis-vaccenic acid.
26. The method of claim 25, wherein said unsaturated fatty acid is selected from the group consisting of cis-vaccenic acid and palmitoleic acid.
27. The method of claim 15, wherein said modified bacterium has an altered unsaturated fatty acid content in the bacterial membrane.

28. The method of claim 15, wherein said low temperatures range from about -20°C to about 4°C.
29. A bacterium produced by the method of any one of claims 1 or 15.
30. A storage stable bacterium, wherein said bacterium has an altered fatty acid content.
31. The bacterium of claim 30, wherein said bacterium is competent for transformation.
32. A bacterium having enhanced viability or enhanced transformation efficiency during storage at low temperatures, wherein said bacterium has an altered fatty acid content.
33. The bacterium of claim 32, wherein said bacterium has an increased unsaturated fatty acid content.
34. The bacterium of claim 32, wherein said bacterium has been modified genetically.
35. The bacterium of claim 32, wherein said bacterium comprises one or more modified genes involved in changing unsaturated fatty acid content of said bacterium.
36. The bacterium of claim 33, wherein said increased unsaturated fatty acid content is caused by enhancing expression of one or more genes involved in changing unsaturated fatty acid content in said bacterium.
37. The bacterium of claim 36, wherein said enhanced expression comprises increasing copy number of one or more of said genes.

38. The bacterium of claim 36, wherein said enhanced expression comprises increasing transcription or translation of one or more of said genes.
39. The bacterium of claim 32, wherein said bacterium is a gram negative bacterium.
40. The bacterium of claim 39, wherein said bacterium is *Escherchia*.
41. The bacterium of claim 40, wherein said bacterium is *E. coli*.
42. The bacterium of claim 32, wherein said fatty acids are unsaturated fatty acids selected from the group consisting of oleic acid, linoleic acid, palmitoleic acid, and cis-vaccenic acid.
43. The bacterium of claim 42, wherein said unsaturated fatty acid is selected from the group consisting of palmitoleic acid and cis-vaccenic acid.
44. The bacterium of claim 32, wherein said bacterium has an altered unsaturated content in the bacterial membrane.
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